WHAT IS CLAIMED IS:

1. A device for detecting a period of an input signal comprising:

a count value setting portion for setting a reference clock to be counted by n times, where n is an integer;

an analog-to-digital (A/D) converter for sampling an analog input signal at each period of the reference clock, and converting the input signal into digital values having positive and negative symbols;

a zero cross point detecting portion for detecting a symbol change of the digital values output from the A/D converter, and generating a zero cross point detecting signal;

an arithmetic processing unit for dividing a sampling interval between two sampling points having a zero cross point therein, by a preset value which is set in the count value setting portion, predicting a zero cross point sector based on the digital values of the two sampling points, and calculating count values of the reference clock in accordance with the preset value and the predicted zero cross point sector;

a counter for accumulating the count values of the reference clock which are calculated in the arithmetic processing unit, until the symbols of the digital values are changed; and

a period value calculating portion for dividing the accumulated count values in the counter by the preset value which is set in the count value setting portion, and calculating periods of the input signal.

2. The device as claimed in claim 1, wherein the arithmetic processing unit further comprises:

a zero cross point sector detecting portion for dividing the sampling interval having the zero cross point therein, by the preset value which is set in the count value setting portion, and generating an increase signal or a decrease signal of the count value in accordance with the zero cross point location which is predicted based on a ratio of the digital values by positive and negative symbol change of the input signal; and

a count value determining portion for determining the count value of the reference clock based on the preset value which is set in the count value setting portion, and the zero cross point location which is predicted in the zero cross point sector detecting portion.

3. The device as claimed in claim 2, wherein the zero cross point detecting portion divides the two sampling sectors having the zero cross point in their center, by n+1 if the preset value is n.

4. The device as claimed in claim 2, wherein the zero cross point sector detecting portion generates, in accordance with the zero cross point location, the increase signal as a value chosen from zero to n in a first sampling point of the sampling interval, and the decrease signal as a value chosen from n to zero in a second sampling point of the sampling interval.

5. The device as claimed in claim 2, wherein the zero cross point detecting portion divides the sampling interval having the zero cross point therein, by n if the preset value is n.

6. The device as claimed in claim 5, wherein the zero cross point sector detecting

portion generates, in accordance with the zero cross point location, the increase signal as a value chosen from one to n in a first sampling point of the sampling interval, and the decrease signal as a value chosen from n to one in a second sampling point of the sampling interval.

7. A method for detecting a period of an input signal comprising the steps of:

sampling an analog input signal at each period of a reference clock and converting the input signal into digital values having positive and negative symbols;

detecting a zero cross point based on a detected change of the symbols of the digital values;

arithmetic processing by dividing a sampling interval between two sampling points having a zero cross point therein by a preset value, predicting a zero cross point sector based on the digital values of the two sampling points, and calculating count values of the reference clock in accordance with the preset value and the predicted zero cross point location;

accumulating the count values of the reference clock calculated from the arithmetic processing step until a next symbol change of the input signal;

dividing the accumulated values by the preset value, and calculating a frequency of the input signal.

8. The method as claimed in claim 7, wherein the arithmetic processing step further comprises the steps of:

dividing the sampling interval having the zero cross point therein, which are detected from the zero cross point detecting step, by the preset value, and predicting a zero cross point sector based on a ratio of the digital values by positive and negative symbol change of the

input signal;

determining count values of the reference clock in accordance with the preset value and the zero cross point location predicted from the zero cross point sector detecting portion.

9. The method as claimed in claim 8, wherein the zero cross point detecting step includes the step of dividing the sampling interval having the zero cross point therein, by n+1 if the preset value is n.

10. The method as claimed in claim 9, wherein the zero cross point sector detecting step includes the step of generating an increase signal as a value chosen from zero to n in a first sampling point of the sampling interval in accordance with the zero cross point location, and a decrease signal as a value chosen from n to zero in a second sampling point of the sampling interval in accordance with the zero cross point location.

11. The method as claimed in claim 8, wherein the zero cross point detecting step includes the step of dividing the sampling interval having the zero cross point therein, by n if the preset value is n.

12. The method as claimed in claim 11, wherein the zero cross point sector detecting step includes the step of generating an increase signal as a value chosen from one to n in the first sampling point of the sampling interval, and a decrease signal as a value chosen from n to one in a second sampling point of the sampling interval.